



US005825677A

United States Patent [19]

Agarwal et al.

[11] **Patent Number:** 5,825,677[45] **Date of Patent:** Oct. 20, 1998[54] **NUMERICALLY INTENSIVE COMPUTER ACCELERATOR**

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[21] **Appl. No.:** 619,456[22] **Filed:** Mar. 20, 1996**Related U.S. Application Data**[63] **Continuation of Ser. No. 217,533, Mar. 24, 1994, abandoned.**[51] **Int. Cl.⁶** G06F 17/16[52] **U.S. Cl.** 364/736.03[58] **Field of Search** 364/736, 736.03[56] **References Cited****U.S. PATENT DOCUMENTS**

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[57]

ABSTRACT

A matrix processing unit is described which permits high speed numerical computation. The processing unit is a vector processing unit which is formed from a plurality of processing elements. The *i*th processing unit has a set of *N* registers within which the *i*th elements or words of *N* vectors of data are stored. Each processing element has an arithmetic unit which is capable of performing arithmetic operations on the *N* elements in the set of *N* registers. Each vector of data has *K* elements. Therefore, there are *K* processing elements. A vector operation of the matrix processing unit simultaneously performs the same operation on all elements of two vectors or more. A subsequent vector operation can be performed within one machine cycle time after the preceding vector operation.

16 Claims, 5 Drawing Sheets